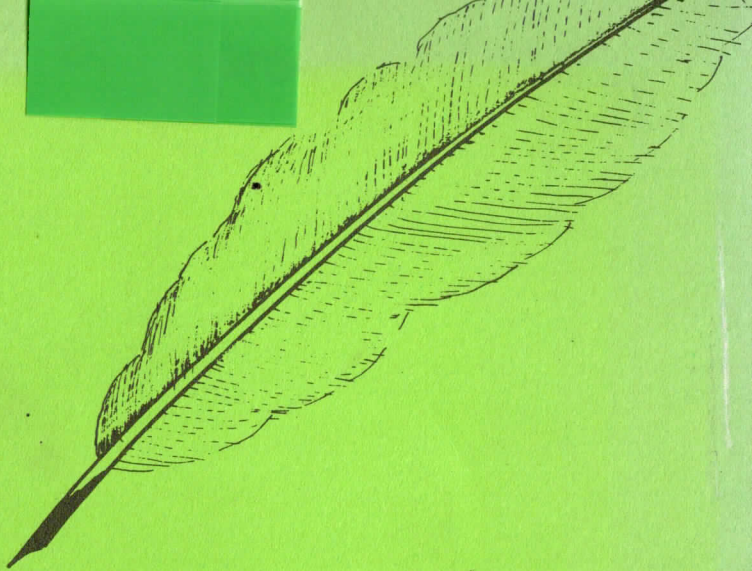




**PRESTEL**  
the  
editorial  
opportunity

A report of  
the first year  
of editorial  
research carried out  
by Mills & Allen  
Communications  
for the British  
Post Office



MILLS AND ALLEN COMMUNICATIONS LIMITED

EDITORIAL DEVELOPMENT CONTRACT

STAGE 1 REPORT TO POST OFFICE TELECOMMUNICATIONS -

MARCH 1979

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## 1. BACKGROUND/INTRODUCTION

The Editorial Development Contract being carried out by Mills & Allen Communications Limited was funded by Post Office Telecommunications for a period of 2 years from 23 February 1978, with a review point at the end of thirteen months. This report is a review of progress during the first twelve months.

The contract was designed to run in the following way:

- introductory phase - what kind of a medium is viewdata? 3 months
- four editorial/experimental phases 5 months each
- final report phase 1 month

The work on the contract to date has been carried out by the following people within Mills & Allen:

- Richard Hooper - Managing Director M&AC Limited
- Ken Knight - Viewdata Services Manager
- Paul McFarland - Editor, Viewdata Division
- Clive Hollick - Managing Director, Mills & Allen International

The following consultants have been used:

- Anthony Smith - Broadcaster and media writer
- Emanuel Sandreuter - Graphics Designer to M&AC Ltd
- Mike Bygrave )
- Tim Hodlin ) - Freelance writers
- Douglas Evans )
- Linda Reynolds - Royal College of Art
- Peter Zorkoczy - The Open University
- Hilary Whelan - Database Manager, The Economist
- Ian McLaren - PA Design Unit

The proposal for the EDC from Mills & Allen Communications, written in late 1977, was based on the following thoughts:-

Historically, each new medium of communication tends to pass through an initial period when its appearance, content and function are derivative of older established media. Early feature films were derivative of the proscenium arch theatre. Early educational television transmitted the 'talking head' of the teacher standing by his or her blackboard. The first railway carriages looked almost identical to the horse-drawn coach. The first printed books copied the size and format of the handwritten manuscript.

After the initial derivative period, the new medium begins to develop its own special appearance and content. The nature of what can be communicated given the new medium alters gently. "We can perhaps assume", wrote Harold Innis in *The Bias of Communication* in 1951, "that the use of a new medium of communication over a long period will to some extent determine the character of knowledge to be communicated".

It is in this more confident development period that the new medium begins subtly to take on new, hitherto unforeseen, functions, leading to the establishment of new occupations, new structures and new ways of doing things. Existing occupations and structures built around the established media begin to undergo change. The established media begin, in their turn, to display some derivative influences from the new medium.

The general aim of the research contract is to shorten the initial derivative period through which Prestel is passing, since it is felt that the success of Prestel will spring from novel applications. If Prestel is only used to do what is already done by other methods, and its appearance remains an electronic version of existing print media, then its commercial survival could be put in question.

The research contract has three objectives:-

- a) to devise new and surprising ways in which the presently available Prestel facilities could be used
- b) to demonstrate that these new ways are effective, economic and practical so that they can be taken up and used by Prestel IPs
- c) to disseminate the results of the work widely via special workshop seminars run in conjunction with the Post Office

The research is primarily concerned with the content and function of Prestel as a medium for storing, retrieving and exchanging alphanumeric and simple graphical information. The research is not primarily involved with the appearance of Prestel although page layout and some aspects of typography are clearly influenced by, and influence, any novel ideas in content and function. Indeed, the complex inter-relationships between content, function and appearance are of particular interest.

## 2. INTRODUCTORY PHASE - WHAT KIND OF A MEDIUM IS VIEWDATA?

In the first three months of the research contract, we posed the question - what kind of a medium is viewdata? To answer it, we talked to existing IPs, to other information retrieval systems (Dialog, New York Times Information Bank etc), to those involved in teletext, to other related organisations (for example - people in the newsletter business) and spent much time living with the database.

The following sections set out some generalisations on the medium, largely deriving from the introductory research phase, but also now tempered by later events and insights. The generalisations refer specifically to the Prestel implementation of viewdata - other viewdata implementations are likely to exhibit different characteristics.

Prestel can only be understood in the context of its current technological design, pricing policies, and policy status. If page-size, routing algorithms, price to end users, the Post Office's common carrier policy towards Prestel were to change, then these changes would modify the type of medium. For example, the move to a time-connection charge makes Prestel more of a browsing medium than it was before. The move to a national replicated database (each local Prestel centre holding the same data) has a major editorial and commercial influence on what will be done with the pages.

### Prestel is a mass medium

The cornerstone of all our propositions about Prestel is the belief that Prestel can only really be comprehended as a mass medium. The economics of Prestel, its easy-to-use design, its mass low cost distribution facility, all converge towards this point of view. By a mass medium, one means significant numbers of people accessing small numbers of pages frequently, as distinct from small numbers of people accessing large numbers of pages infrequently. The Post Office's decision to restrict CUGs to 15% of the database follows naturally from this argument.

But Prestel is a mass medium with many differences. It has the potential of being the first individually tailored mass medium. The viewer calls up pages he/she wants to see when he/she wants to see them - no tyranny of transmission time here. The viewer also has no need to buy the whole book to get the single page being sought. Because of differential reading speeds, Prestel is particularly suited to one-to-one relationships between screen and reader. However, the Lucas Aerospace pages by Tim Hodlin amply demonstrated that for certain material (argumentative) Prestel could be a group viewing medium (see Section 4).

Prestel is unlike other mass media in requiring the reader to be ACTIVE. Unless the viewer makes a decision, the same page will sit there forever. Prestel is not an inertia-selling medium. Therefore a key skill in Prestel design is encouraging active response and the desire to view more pages. Only in the short term will this be achieved by weak, non-information pages. The true skills lie deeper than that.

Prestel is not (in the foreseeable future) a mass medium in the sense of mass storage. The capacity of the frame (22 lines of 40 characters - 75 words + space for title and routing instructions) and the system (250,000 pages) are very limited. It is therefore a mistake to approach the medium as if it could be encyclopaedic.

Print-on-paper shows no signs of losing its role in storing encyclopaedic information. On-line databases, about 400 world-wide, tend not to store information but information about information (55 million bibliographic citations). Prestel is particularly suited to abstracted, boiled down, purified information, at a time of information and paper overload. People will use it for key ideas not universal knowledge. There is no evidence of anyone planning to put up all current films showing at all UK cinemas (the encyclopaedic approach for a national database) - but there are lots of IPs putting up selections and best buys.

Finally, let us turn the argument slightly. To survive as a truly mass medium, Prestel's costs have got to be kept very low to the user and, equally important, it has got to hold a combination of hard and soft data. Hard data needs alone (train times, weather, latest news, cinema listings) will never be sufficient, certainly not in the residential market, to generate mass audiences. Software (games, horoscopes, the unexpected, education) will play a central role in Prestel. This fact alone has substantial impact on future design considerations.

#### Prestel is not a sophisticated information retrieval system

It is a mistake to perceive Prestel as an information retrieval system in the sophisticated sense of Lockheed Dialog or Reuters Monitor. The price for Prestel being simple to use by non-specialists is that the indexing system is crude. It is ideal for information that can be placed in groups of single, interlinked pages. It is in fact a "PLUS" - a Page Look-Up System. It is ill-suited for information that is scattered on large numbers of different pages.

Most on-line IR systems are not page-orientated and draw together data from all over the database on the (expensive) request of the user. Prestel is ill-suited for information that has to be searched by more than two or three different routes or key concepts. Prestel is ill-suited for information where the request for information cannot be formulated in one of a very few standard ways to suit 80% of the users. Prestel is well-suited for a piece of information that can be stored under the same page number and needs to be looked up on a regular basis. (Page 6910 is an "internal" example).

The notion of the model of the Prestel viewer is important to discuss at this stage. Most on-line IR systems aim at a reader who knows what he is looking for - i.e. a rational problem-solver and information seeker. Someone who wants to know the train times tonight to Cambridge.

Because Prestel is not encyclopaedic, and because it is not a sophisticated IR system, it may have difficulty satisfying the rational information seeker. The information being sought is either not there at all, or not readily findable. Thus Prestel must also be designed to cater for the serendipitous reader with less focused information requirements. He or she is more likely to find satisfaction. For example, the gardening enthusiast may not find information about pruning a specific shrub, but will find general information about pruning.

The difference between the two worlds of the reader can be understood using the analogue of tank weaponry. A tank has two main types of ammunition; armour-piercing and high explosive. Armour-piercing shells have to hit the target to succeed (if they miss by an inch, they miss by a mile). HE shells can hit within a radius of quite a few feet and still be effective. (But of course, an HE round will do little damage to tank armour!)

A crucial feature of Prestel is ease of access and storage. It is because of this that it is deemed to be an information retrieval system. But unlike print-on-paper media, Prestel is not at present portable or hard-copy recordable. It is in fact a storage medium that allows pages to appear, and then disappear without record.

Prestel has therefore, paradoxically, some of the ephemeral characteristics of broadcasting. Looking back a page or on to a page costs money, thus reducing the scope for browsing. The information structure of Prestel is largely invisible to the user (except for those routing instructions selected to appear on the particular page currently being viewed) - whereas the structure of a book is very visible. Positioning, i.e. the location of the reader in the pages, is a difficult editorial problem for Prestel.

Given these special characteristics of Prestel, it may be more fruitful to describe Prestel not as an IR system, but as a publishing/communications device. Instead of a databank, it can better be comprehended as an electronic notice-board or a newsletter facility.

#### Prestel is an update medium but not a real-time system

Theoretically, at least, every second on Prestel is a deadline. Each user, mentally, will expect a page called up at 12.10 to be up-to-date and up-to-the-minute. Sportsdata on 345 advertises 'up-to-the-minute' information. In practice, there is a danger of overstating its update-ability. First of all, update = up price. Updating is labour-intensive and expensive. If a page is updated at time 'a' and then again at time 'b' at a cost of x, the number of frame accesses between times 'a' and 'b' must generate a revenue of at least x. If the time between 'a' or 'b' is a year, it is likely, given the current size of the market, to yield x more easily than if the time is 24 hours.

Secondly, Prestel is not a real-time system in a technical sense. Each page called up resides in the Prestel set, and therefore any updating to that page at the head end is invisible to the user. For sports news, this is a severe limitation of Prestel. By contrast, a teletext page once called is automatically refreshed/updated on each cycle past.

The limited updateability of Prestel increases the sense in which it is an ephemeral IR system. The user (and probably the IP) has no automatic record of the previous state of the page. Prestel is the world's first erasable mass medium.

#### Prestel is a promotional medium

Prestel pages promote in two ways. First of all, they promote the name of the information provider (it is for this reason that we find it strange that some IPs have dispensed with their familiar name and invented a special name ending usually in -tel). It is extremely difficult on Prestel to separate advertising from information. The new medium does not encourage such traditional demarcation.

Secondly, each Prestel page is required by the routing structure to promote subsequent pages. It is for this reason that there is no such thing as a pure information page. All pages must have some routing on them. This is usually forgotten by new IPs. Indeed, the argument can be taken further - no page ought to be a pure index page. The attempt should be made to drag information as high up the tree structure as possible.

#### Prestel is not interactive yet

There is a danger of seeing Prestel as more interactive than in reality it is at present. There is a problem with the word 'interactive'. Prestel on Gresham St is not interactive at all when compared with viewdata on Martlesham, in the sense that the routing does not allow for any computer processing. Prestel on Gresham Street does not know the track of a viewer through the pages and has no power to direct him/her on to a next page except at the direct choice of the viewer.

Nor does Gresham St provide any calculation/facilities (except of course for billing purposes!) Prestel is interactive, by comparison with teletext, in the sense that the viewer can be moved to up to 10 other pages by a single key depression which is an upstream command to the computer. It is also interactive via the response page facility.

One of the implications of the general lack of interactivity on Prestel is that for games applications three or four times more pages may be required to mount the game, and the games tend to creak at certain points in the procedure without access to processing power.

#### Conclusion

Prestel, we believe, as a result of our EDC work so far, is not quite what it seems. At the risk of over-simplification, the kind of medium that we found people generally believing in at the beginning of the EDC and the kind of medium that the designers of viewdata thought they were producing, is at variance with our analyses.

The original perception of Prestel was a hard data information medium for people who know what they want to find out - and therefore stay connected for a short time - which will take off first in the business market.

We would see Prestel as much richer than this (and the first market research coming in as this report goes to press, bears it out). It is a medium for hard and soft data, for information and entertainment. It caters for both types of people - those who know what they want exactly and those who have less focused information needs. It's a warmer medium, with the possibility of 'longer dwells' on line. It will take off simultaneously in business and residential markets because the two feed each other commercially.

### 3. PHASE 1 : WRITING FOR PRESTEL

During the next five months (June-November 1978) we looked at the problem of Writing for Prestel. We found the questions posed themselves at three levels: the first was the grand level of the database as a whole; the second was the more intimate level of the individual piece being written; and the third the level of the individual page. In addition, considerations of style, grammar and vocabulary transcend all three levels while at the same time providing a link between them.

Much of this phase was devoted to the creation of three sets of experimental pages on current affairs (\*6965) which were then presented at the seminar Writing for Prestel on 15th November 1978. About 140 frames were created and remain on the Prestel database.

The authors - all professional writers - chose topics as follows:-

Douglas Evans (specialist on energy) : Energy Policy (70 frames)

Tim Hodlin (television researcher): Lucas Aerospace Workers' Combine (40 frames)

Mike Bygrave (ex-Time Out now freelance): Law and Order (40 frames)

For Evans and Hodlin Prestel was an entirely new medium and the task of writing for it had never hitherto exercised them. Bygrave had at least seen Prestel - he produced a report for Time Out when that magazine was first considering its own commitment to Prestel - but he too had never written for it.

#### Background

Before we discuss the experience of these pages more fully, some initial points should be made.

We chose to look at the subject of writing for Prestel first - that is before its sister subject, designing - because the experience of traditional media suggested this was by and large the natural order of things.

Our experience, though, in creating these pages quickly showed the temporal division between the two to be much less distinct. This was first of all because the creation of pages could not be considered without the design factor - graphic design and routing design - imposing itself as the writer put pen (or rather typewriter ribbon) to paper.

Further, in putting those penned sentences on to the Prestel screen necessarily involved the prior creation of a fairly complete design framework. Similarly, much of the discussion at the seminar Writing for Prestel in fact centred on the physical appearance and not on the content of the pages presented.

Finally, the "production" process required a considerable amount of on-screen editing of text, either to make the copy fit within the limitations of 39 (effectively) character spaces and no proportional spacing, or because the final appearance of the particular frame would be enhanced by textual reshuffling, deletion etc.

#### Experimental Pages

The experimental pages therefore were very much coloured by this design aspect, and the three writers adapted more or less easily to what was for them by and large a new consideration.

Traditional media require of the writer that he concentrate on writing and leave the "packaging" of what he writes to others. For Evans, now working mainly on books, his work ceases once the manuscript is finished; after that he is consulted. Bygrave's freelance work requires of him much the same approach, though his five years at Time Out - the first five years of this particularly design-orientated magazine - may have prepared him better for the broader needs of Prestel. Hodlin, experienced in television, normally prepares the ground on which a documentary will be filmed. The fourth writer involved was Mills & Allen's Paul McFarland, who co-ordinated the work and undertook the actual production of the pages. He too is a journalist, this time a former sub-editor who was at least conversant with the full process from research to composed page in print.

We had chosen to employ writers because, though much of Prestel's database (perhaps 80%) then comprised what might be termed directory information, the concept of a new communications medium - and particularly the opportunities offered by creative routeing design - appeared a heaven-sent gift for wordsmiths trapped by the linear media of print and broadcasting.

Prestel, then, with its unique routeing potential was made for the postgraduate student who felt himself incapacitated by the need to write a thesis in sequential prose, when he had spent three years thinking in interwoven patterns comprising each one a separate and distinct idea. But the crux for him was that, having decided the best solution was to submit his text on a music score, none of his tutors would countenance the idea.

For our three experimentalists then - and for all who produce sets of text for Prestel - the difficulty lay in adapting the orchestrated strands of inter-connected ideas to the sequential reading habits of the user. In print, the solution is enforced by the requirements of starting in the top left hand corner, finishing at the bottom right (in most parts of the world at least) and then turning the page. Not so in Prestel. The system allows the writer to lay out his paragraphs in the manner of a jigsaw. So in Prestel the hard part is to make the pieces of the jigsaw look like parts of a complete picture of something. The three writers adapted to this problem in quite different ways.

Evans' pages on Energy Policy - 70 in all - provided a problem of scale. He originally conceived of them as concentric circles. The centre was his introduction and main index. Eight filials led to the top pages of each section - coal, electricity and so on - with the outer rings comprising more detailed analyses of each sector.

The difficulty he encountered concerned his notion of a kind of mathematical expansion outwards. Each top page had two filials, each of those four. But when it came to putting in the text, it quickly became apparent that the needs of the information and the needs of the user who might want to read sequentially were not catered for. So in many of the sections a subsidiary index was created, enabling the user to dip in and return or alternatively to read across the end pages. The end result seems to work but there was that stage when the routeing posed problems for the writing.

Hodlin faced similar difficulties, starting as he did with material that was essentially sequential. He too had eight filials off his main index - sections on the workers' proposals, the company, the company reaction etc - but he chose to create each section sequentially, on frames. That gave the user the choice of which sections to read and in which order, but once into a sequence of frames there was often no other choice but down.

Bygrave, however, tackled the structural problem in a wholly new way. He called his pages on Law and Order an open debate. Half the material comprised the sections, in sequential frames, on particular areas of concern - crime figures, young people in trouble etc - accessible from an index or as a choice at relevant stages in the debate proper. This comprised factual evaluation interspersed with deductions. The user would choose his next page on the basis of his agreement with one or another of these deductions, but the chosen page might in fact present him with a counter-argument. Thus the routeing "choice" revealed an almost authoritarian approach by the author.

The success of Bygrave's pages amongst IPs has been remarkable. Clearly they use Prestel's unique feature, its routeing, for a journalistic approach to a topic that no other medium could tackle, and offer a model which those newspapers who have registered as IPs could well take note of.

Having either made use of the routeing opportunities or tackled the routeing problem (as the case may be), the three could then look at the question of writing. For each the problem lay in how to give each individual page some kind of homogeneity as an entity in itself, accessible by the user without reference to any other page in the set, while at the same time clothing it with an identity common to all.

Here a conceptual difficulty arose. Clearly they were not writing articles or books or programme notes. But what were they writing - a database? a codex? Hodlin tended to refer to his "programme" (or possibly he meant "program"). The result was to talk in terms of a "set of pages" with all the disunity that the term implies.

To the problem of the individual page seen always by the user in isolation from absolutely every other one in the Prestel database, the solution was to write in sections of 75 words or so, to try and parcel up the text into neat bundles the size of a Prestel page.

That involved two techniques new to the writer experienced only in traditional media - an unusual degree of organisation of the material; and the need to adapt style.

Evans in particular had to re-appraise the polysyllabic vocabulary he used when writing for books. On Prestel he found his vocabulary enabled him to say very little in 75 words, and to get very few words on to a line.

Hodlin on the other hand evoked the annotated style of the researcher, dispensing often with verbs, abbreviating wherever he could, getting the information across in half as many pages as even many experienced IPs would require.

Bygrave settled for a middle course, producing a style at once recognisably English but at the same time crisp almost to the point of being bald.

Now the problems of the physical design of the Prestel page reared once more. Much editing was done on screen, either to make the material fit neatly, or more often, to find a way round the problem of a very ragged right hand margin. One solution was to compromise on punctuation, often omitting commas or omitting the space afterwards. The other was to rewrite and that usually involved using short words much more than in print where there is room to vary one's choice of words to avoid repetition. In Prestel the need is often to sacrifice that variety for the sake of the appearance of the page.

## The Seminar

Our experience with the experimental pages suggested it was nigh impossible to consider writing for Prestel in isolation from other, wider considerations, and this experience was borne out during the seminar.

Two of the speakers - Rex Winsbury (Fintel) and Sir John Barran (COI) devoted much of their time to problems of design in all aspects of the word. Winsbury showed particular concern for page design and the use of colour while Barran discussed the need in his particular Prestel application for conceptualising the complicated structure of a wide-ranging mass of multiple-indexed information.

Both, however, contributed to the notion of writing for Prestel. Winsbury was guided by the need to provide the user with "value for money" and had consequently designed densely packed frames with the minimum of space sacrificed to information content.

He had also produced, on Fintel's database, a blend of abstracted and original material, a blend David Gordon of The Economist (another seminar speaker) hoped to provide in his own database.

Barran, on the other hand, took the problem a stage further. On the one hand he was reproducing on Prestel existing information, but looking for new ways to present it; and on the other hand he was dealing in many cases with semi-legal data couched in the jargon of the legal business, and here he hoped to render hitherto incomprehensible material available to a new market. In other words, Prestel, he felt, was at the same time forcing him to look for a new literary style and giving him the chance to conquer new ground by doing so.

It was left to the last speaker, Professor Raymond Williams, to examine some specific problems encountered by others. "Abolish the subordinate clause" was his clarion cry. The English language, he felt, was the most flexible of animals and change should not be resisted in a language born of change. We should look for a new way of writing, in crisp and clear sentences, uncluttered by laboured syntactical structures, and further in short sentences and paragraphs which would not physically clutter the page.

This had also been the conclusion of the experimental writers, of whom Hodlin perhaps took things to the furthest extreme. His style - christened at the seminar "viewspeak" - aroused controversy on the floor, attracting on the one hand praise for imaginative use of the language and on the other, criticism that precisely such linguistic manipulation was at the root of the country's falling literacy standards.

## Some general points

For the journalist the move into Prestel requires not so much the accretion of new skills as the adaptation of old ones. The traditional processes pursued in writing for print media must be pursued also in Prestel - research, write, edit, design, compose, proof-read and publish.

The principal difference is that in print possibly seven and at least four journalists/printers will have a hand in the production process. In Prestel it is technically possible, and may be commercially desirable, for one man or woman to do the lot.

Leaving aside questions of job demarcation and trade union policy, clearly what is required is the application of traditional sub-editing skills together with a number of underlying guidelines specific to Prestel.

## 1. Writing for Pennies

In one respect the writer schooled in print or in broadcasting must completely readdress his approach; the relationship between the piece of information and the price charged for it. 75 words written for a newspaper for example will only comprise part of an article. There will be several articles to the page, perhaps several pages to each thematic section, and several of these sections in the whole newspaper; and it is the newspaper as a whole which changes hands for money.

Prestel is quite different. Each parcel of 75 words may have a price attached to it. A man who buys a newspaper puts part of the purchase price towards a football match report even though he may not wish to read it. The Prestel user however need only pay for what he wishes to read.

So the Prestel writer must firstly ensure that each parcel of information gives value for money; and secondly - for obvious commercial reasons - he must use it to "sell" one of the pages routed from it.

## 2. Writing with style

Most print houses have established over the years, a house style both to give guidance to writers, editors and printers, and to provide the product with a coherence and a sense of identity. There seems no good reason why Prestel IPs should not seek to meet the same ends.

House styles in print need not be an obstacle to the writer, for highly advanced technology enables much latitude in the production process. Although there is an overall limit on space, there is always room within the individual paragraph for a style, aspects of which may consume space. Secondly, proportional spacing between individual letters, words and lines allows the composer to arrange, say, two articles of quite varying length within similar blocks of the stone or on the light table.

In Prestel however, there is no such latitude and a house style must allow the room for manoeuvre which the technology fails to provide.

Thus it may be necessary to avoid house rules on for example, spacing after punctuation, to allow for the flexibility in each line which in print is provided by proportional spacing. Similarly, it may enhance the design of a page to expand on some words normally abbreviated and vice versa.

A glance at the database does however reveal one area in which many IPs need to tighten up, that of hyphenation. We find the rules of hyphenation in general not only varied but often at variance with each other. But there can be few excuses for, on the one hand the IP who hyphenated the word "ar-ound" and on the other, for the IP who commonly ends a page in the middle of a sentence followed by the command "press".

## Conclusions

We looked at Writing for Prestel at a time when perhaps 80% of the Prestel database comprised "directory" material. At the time of writing that is still the case. And in fact much of the textual information has a directory feel to it: be it horoscopes, information on foreign countries for travellers, book reviews or whatever.

The message from Prestel seems to be "look up some information"; "look at a page" rather than "read all about it". Further, and preliminary data from Post Office market research would seem to bear this out, the user feels he is seldom presented with more than the bare facts on any topic. There is little depth to the information and even less opinion on Prestel. And where there is depth and opinion, the information has often been transferred word for word from existing print sources.

So what about the experimental pages, which are in-depth and opinionated pieces? Is such material unsuited to Prestel? We believe such material is particularly suited to Prestel as a mass medium and to Prestel as a non-linear reading medium.

In that case, why has there not been a proliferation of such items on Prestel? Perhaps there are three reasons:-

1. Prestel is largely conceived of as a directory information system
2. Reading on a non-linear medium with small pages is not in itself particularly easy.
3. The production of such material is a necessarily time and money consuming operation and a test service Prestel which produces little revenue for the majority of IPs is being stuffed with pages that are quick to produce rather than with pages that are slow, difficult and expensive.

Perhaps, then, Prestel now is not a writing medium, is not a journalists' medium; but that the time will come when it will be such a medium.

#### Summary of Main Points

1. Writing for Prestel cannot be considered in isolation from factors outwith the control of the writer. These include the physical limitations of the Prestel page (22 lines of 40 characters each), and technical limitations such as the absence of proportional spacing.
2. Writing for Prestel should not be considered in isolation from the overall routing/design structure of the information. It is advantageous to treat the individual Prestel page as part of a wider set of pages, which in turn are part of a database. At the same time each page should stand on its own as a coherent entity.
3. Writing for Prestel should not be considered in isolation from the overall graphic design of the Prestel page, of the set of pages, of the database. The physical appearance of a page and any graphic design on it will both determine and be determined by the amount and choice of words on that page.
4. The writer on Prestel, whose pages cost money, can never escape the reality of the relationship between what he writes and its existence as a saleable commodity. Each page must at the same time sell another page routed from it and in itself offer value for money.
5. The IP should adapt his existing house style, or adopt one in the first instance, to give the database as a whole a coherence and logic, while at the same time not fettering the freedom necessitated by other, especially design, constraints.
6. Prestel has potential as a medium for writers producing material to be read rather than referred to. But the economics of a test service dictate against filling frames with material that is slow, difficult and expensive to produce - i.e. truly original material.

#### 4. PHASE 2 : DESIGNING FOR PRESTEL

In Phase 1 we had found it difficult to shut ourselves off from questions of design; and so we chose to look at those questions in their own right in the second phase, November - March 1978/9. There seemed to be two areas for consideration, at once distinct and interwoven, those being graphic design and routing design.

As in Phase 1, a seminar was held (14th February 1979) and experimental pages were created and also presented at the seminar. This time we asked five people to create pages and selected for them a single piece of information, a pocket railway timetable.

We alighted upon directory type information, as it was still the predominant form on the Prestel database: the experiences would therefore be of interest to the widest range of IPs both current and future. Further, we wanted to give the experimentalists an identical piece in the hope of reaching some general conclusions on design unfettered by editorial considerations. A rail timetable would be more suited to an examination purely of design factors than would, say, a political piece or a feature.

We chose the London-Cambridge timetable because of its particular relevance - Dr. Alex Reid and Dr. Ederyn Williams are regulars on that route; one of our own staff at present commutes each day to London from Cambridge. In general, though, most of us are "users" of railways and therefore of railway timetables so we hoped to reach some conclusions not only as Prestel IPs but as Prestel users.

We chose as our designers people already familiar with Prestel. Three were IPs with Prestel design experience: Hilary Whelan (The Economist), Dr. Peter Zorkoczy (Open University) and Ian McLaren (PA Design Unit). The other two were Linda Reynolds, whose Graphic Information Unit at the Royal College of Art was commissioned by the Post Office to report on legibility on Prestel; and Mike Bygrave, who wrote and designed pages on Law and Order during Phase 1 of the contract.

#### Graphics: The Need for Good Design

In one sense, the need for good graphic design on Prestel is self-evident - just as it is in any other visual medium. But Prestel, we feel, presents the IP with some special problems.

Firstly, Prestel is to be marketed as a mass information system, the very first one too. The packaging is therefore going to be a vital selling point. We have discussed in Phase 1, the general tendency of users to "look at" pages before or instead of "reading" them. Prestel's visual appeal or otherwise will therefore have a crucial role to play in selling it in the shop or rental showroom - particularly as the potential customer will "see" Prestel before he ever gets to "use" it.

Secondly, there is a strong and not entirely erroneous association between Prestel and that quintessential visual medium - television. Prestel, after all, displays its wares on the television screen. Its potential is thus a combination of the authority of the printed word - a traditional authority - and the newer authority of the screen.

But alongside the need for good design lies the difficulty in achieving it. The limitations of the page size leave the designer with little room for manoeuvre to offer both visual appeal and information worth the price within a 960 character space matrix (880 spaces for the IP).

Page size is only part of the problem. Of the seven colours, only the four most luminous (white, cyan, yellow, green) are really suitable for text - and

in any case there are plans to put a substantial percentage of monochrome sets in the field. The graphic matrix of 3 x 2 is not fine enough to reproduce many IPs logos in anything but a "lego" representation, and similarly limits the design of any other motif. Only one alphagraphic face is readily available to the majority of IPs who - according to the current database - are unable or unwilling for whatever reason to "build" a large typeface using the graphics keys.

There is similarly no choice in the alphanumeric typeface. Each user terminal has a single character generator and the fact that these vary from set to set only causes the IP further problems of design. Finally the current unavailability of Mark II editing equipment means most IPs are unable to input new facilities such as contiguous colour, separated graphics, background colour and double height characters - all of which the user can however, receive.

In short then, the IP must make full use of the comparatively few tools he has at his disposal. He must aim to produce pages at once attractive to the eye and intelligible to the mind, and yet economic for him to create and maintain, and economic for the user to access.

#### Routeing: The Design Opportunity

For all the difficulties involved in graphic design on Prestel, the IP has nevertheless a wealth of related tradition and experience in the design world to fall back on. When he first faces routeing design however, he quickly realises there are precious few experts to turn to.

Prestel's routeing is its unique feature, the facility that makes it truly a non-linear medium and thus different from print or broadcasting. In a book each page follows the previous one in a fashion at once familiar to the reader and simple to comprehend. On television, the news items, the speeches in a play, the commercials are all linked sequentially.

Moreover, the reader or viewer has only two real choices - to carry on or to do something else. Traditional media are therefore effectively passive. One just sits there and all the world will go by on the screen or in print.

Not so on Prestel which is an essentially active medium. Once the user has called up a page, no other page will replace it until he presses another key. Prestel is even more demanding of the user than teletext which replaces pages as they are updated and transmits some as a cycle of frames, each being supplanted by the next after an interval.

Prestel's "activity" thus presents the IP with both a burden and an opportunity. The burden the IP must bear is that of providing the links between pages which the system itself does not imply. As there is no implicit method of getting about the database, the IP has to take on the job of providing the means, both by creating the routes from one page to anything up to ten others, and by telling the user he has done so.

Moreover, the size of the Prestel page (an average of 75 words of text) dictates that the "joins" become a large part of the whole. In a book often a single page of contents (and sometimes not even that) suffices to set the reader on his way, confident of finding everything he wants to read. In Prestel that job has to be done again and again, on every page.

Routeing then, can be burdensome, and in our experience some IPs see it as just that. It is, however, a great opportunity. The essence of a non-linear medium must be that at last the opportunity exists to present information in its most usable form, and that will often be a non-sequential one. Instead of forcing a reader to cover ground he doesn't want to cover, the IP can present information in concise parcels, each one self-sufficient, and each offering the user the choice of what to read next.

Nevertheless, the situation is potentially a complex one and for that reason routeing requires to be designed. Each page must not only convey information but also promote at least one "next" page and to do that the IP must first of all structure his information, classify it, produce transparent models of the data. Promotion of the "next" page is furthermore a commercial decision which must be taken by the IP anxious to make money out of frame accesses.

Secondly he must be consistent in his routeing. We believe that it is natural to present information in a non-linear mode; but as it is not usual to do so the user needs to be educated in the methodology. That necessitates consistency on the part of the IP. His routeing must be designed to fit a pre-determined pattern with which the user can identify. The system whereby a user has ways down, back and/or across a set of data must be consistent and intelligible.

One could go further in fact. The absence of such systemisation in the super-structure of Prestel - a direct result of the common carrier policy - means that there is no consistency across the board. If every IP adopted a routeing algorithm, the user would at least find consistency - 160 different systems. If today's user is by and large confused, then the answer may lie in the introduction of a basic set of standards, which might include for example, consistency in key number allocation.

#### The Experimental Pages

We have discussed above the need for economy and that need was one that exercised our experimental designers. The problem was - how to provide pages that are easy to read while at the same time not consuming too many frames (expensive for the IP) or making the user read too many frames (expensive for the user).

Linda Reynolds chose the course of legibility. She used only more luminous colours (white, cyan and green) and she limited herself to a single column of train times per frame. Moreover, she restrained from abbreviations of ancillary information (buffet, changes etc) wherever she could.

The result was a set of frames well received at the seminar, the participants welcoming the clarity of the presentation. It was interesting that such a reaction was presumably that of a group of users. Miss Reynolds created 11 frames compared to a norm among most of the others (and incidentally British Rail) of seven or eight. Yet none of the IPs present seemed concerned that were British Rail to adopt the "Reynolds" approach they would need to lease perhaps 30% more pages to fulfil their Prestel aims. The generous use of pages did not however, imply significantly more accesses for the user. The two issues of economy are quite separate.

Mike Bygrave, Hilary Whelan and Peter Zorkoczy all needed fewer frames and at the same time designed their pages to include information not on the original pocket timetable. Each used the front page - the index to the specific timetable information - to include other information as well. Bygrave gave the fare tariff and the average journey length; Miss Whelan offered the user news of delays and cancellations, updated daily; and Zorkoczy summarised the timetable information so that some users might not need to go any further.

All three had thus designed their index to be more than an index. Gone was the clarity of Miss Reynolds' simple list of prompts under a page title. The cause of legibility was to a greater or lesser degree sacrificed in favour of putting more information on the page.

McLaren took a different approach again, and aimed as far as possible to include all the information on the pocket timetable (which in fact details the full Liverpool Street - Kings Lynn timetable) and no more. The result was a much more numerous set of pages than any of the others.

Apart from McLaren, the designers all used horizontal rules at the top and/or bottom. Miss Reynolds chose the brightest of the colours, white. But the other three all used dark blue, with more luminous colours for text. Only Miss Whelan - who put "sleepers" between her rules to denote a railway track - introduced a specific graphic motif and she did so without noticeably cluttering up the page or consuming any extra ones through lack of space.

During the creation of these five sets of pages, there was no collaboration between the designers. It was interesting therefore to see so many common features emerge. The more important the information, the more luminous - in most cases - was the colour used - the majority of train times were white. Similarly, the graphics were in three of the four designs using graphics, dark blue - one of the least luminous colours.

Similarly, routing information was usually separated from the rest of the page both physically (placed at the bottom) and by a change of colour. Finally, every one of the 50 or so frames created had some kind of page title which helped ease the problem of conceiving of any Prestel page as part of a greater whole.

#### The Seminar

Many of the design questions and difficulties discussed so far had beset Mervyn Kurlansky of Pentagram Design - commissioned by the Post Office in 1978 to design an identity for Prestel and for Post Office Prestel indexes - the opening speaker at the February seminar.

Print, he said, had developed so many techniques over the last five centuries which were quite beyond the capabilities of the Prestel system with the result that the designer schooled in the print tradition who turns to Prestel design must find new techniques and make do.

The problem of Prestel's design inadequacies was in some way explained by viewdata inventor Sam Fedida, the last speaker: greater design capability was possible, but the priority now must be to concentrate on technical developments which will put a large number of sets in peoples' homes; higher transmission speeds to allow a finer matrix, photographic reproduction, typeface choice and so on could be introduced in later stages of development.

But Kurlansky's principal concern was the design of an identity for Prestel. The IP, he said, often has to work within the framework of an existing company identity, whether that identity be manifest in colour choice or in a symbol to be somehow represented on the Prestel screen. He however had the task of designing from scratch for an organisation whose identity was on the one hand brand new and on the other bound up with the capabilities or otherwise of the medium on which he was designing.

The problem for IPs he said, was that the paucity of the design tools tended to reduce various designs to a level common to the whole database - he exemplified the restriction of having just one alphabetic typeface compared to the countless faces available in print. Every IP, he felt, should consult a graphic designer.

In discussion, further doubt was cast on the unconventional Prestel wisdom that upper case is more legible. Kurlansky was inclined to support upper case but it was clear that much depended on the typeface generated by the particular terminal being viewed.

Tackling the other side of design on Prestel, the routing or database design, Ken Knight suggested that IPs were faced not with a paucity of tools but with quite the opposite - a surfeit of design opportunities. His work on routing design led him to recommend the adoption of a limited number of routing algorithms. (Algorithms or recipes are simple rules for determining the routes from a page. An example would be: route 0 always goes to a page's parent, route 9 to its grandparent and routes 1-8 to its filials).

Free use, at this stage, of the almost limitless combinations of subdivisions, routes back and routes across would lead to incoherent collections of pages incapable of comprehension as a whole even by their creator.

Knight's algorithms were derived by considering and reconciling models of the reader - where he starts, where he finishes and what he does in between - and models or classifications of the data.

#### Some General Points

1. Rainbows - are there pots of gold at the end?

The current database shows a fairly consistent pattern of experience regarding colour choice. Many IPs when they first sit at a Prestel keyboard, appear to be driven to use the full range wherever they can, often arbitrarily and to the detriment of the final result.

Quite quickly, however, designers seem to abandon this "rainbow" approach, and many of the most experienced IPs use in fact very few colours, stand by a proven store of colour combinations - often only two or three - and use the other capabilities seldom if at all. We can expect that the new facilities will be similarly operated in the early stages.

Colour choice is largely a matter of taste, and in any case is affected to a greater or lesser degree by the make of set and the lighting conditions for viewing.

Thus magenta red and blue text can be legible or not according to the light, the set and the sensitivity of the eye. Though there is a strict order of luminosity the other four colours (white, cyan, yellow, green) can appear comparatively more or less bright. White in particular is unpleasantly bright to the sensitive eye on some sets, yet is represented as a cool grey on others.

The Prestel designer can do nothing about these factors in themselves, but evidently many have grown aware of them and opted in their frame designs for conservative choices of colour to allow for many of these variations.

Finally, of course, there is the monochrome set. Subtle colour coding of information is entirely lost on the user without a colour set and assuming that a market is found for the proposed output of 10 - 20,000 mono sets in 1979 none of those users will be able to tell whether, for example, their share prices have fallen or risen by the colour-coded number of points.

At the same time there is a limit to what the IP can do for the monochrome set user. Prestel is after all a colour medium; and it is noticeable that the television companies are abandoning some of the concessions they used to make. Time was when football teams would change their strip to avoid a clash (or rather lack of it) on the screen. Now the viewer has to distinguish between the various shades of grey with often no help at all.

## 2. One Make of User Terminal is More or Less Unlike Another

Many IPs have now realised - entirely by accident, as no-one told them - that not only do different makes of terminal reproduce the colours differently, they also vary in the aspect ratio of the page and in the typeface of the character generator.

On ITT sets, for example, which display a sans serif face, some letters of the lower case alphabet consequently have little impact ('i' and 'l' in particular); and spacing is often disproportionate between letters and words in lower case. But the converse is that caps tend to be intrusive to those sets with serif displays.

Punctuation offers similar problems for the designer. On some sets the angle of the apostrophe is so sharp that it is meaningless as one of a pair of single inverted commas. Again the size of full stops and colons can vary by a factor of four on different sets. On one, the colon is both large and suspended above the line, not on it - so ugly in fact that some designers may yet want to urge their editors to abandon it as a piece of punctuation.

Relevant to the designer of logos and motifs is the variation in reproducing the graphic matrix. The three horizontal lines of the matrix are reproduced by ten scan lines on the screen; two graphic lines each and one of four. However there is no standard for the choice of the thick line - so the thin rule the IP thinks he input on to Prestel may be the thick rule on the sets of many of his readers.

## 3. Consistency

Although self-evident to most IPs, using the copy across facility is a vital procedure if a set of frames are to have consistent design. Even the merest graphic imprint on a page or a detail such as where the routing information is placed (to the exact space) can vary enormously from one frame to the next.

The simple way round this - and a better one even than placing two sets side by side - is to create a form page containing every minute detail, including location of colour changes etc., which is to be common to each frame of a set.

Copying across also facilitates the deployment of specific routes which are common to a number of frames such as a cross-reference to a glossary or a way back to a particular page from any of the others.

## Summary of Main Points

1. Good graphic design is essential to a visual medium such as Prestel. Pages must not only be informative and offer value for money but also be attractive to look at, pleasant to read.
2. Good graphic design is essential as part of Prestel's appeal, and perhaps in any case its initial appeal to the potential customer is the visual one.
3. Good graphic design is essential to enable the IP to get the best out of the limited design tools at his command.
4. Good graphic design is essential to enable the IP to make the best use of each frame, given its limited size.
5. Good graphic design will tend towards a few colours on each page which combine well, and away from "rainbow" colour schemes.
6. Good graphic design will take account of the variety of user sets - not all sets are colour, not all sets are the same size, not all sets reproduce the same alphanumeric typeface.
7. Good graphic design should take account of the varieties of user - some are colour blind or have mono sets so colour-coding of information will be lost; others have difficulty reading text in less luminous colours.
8. Routing should be designed with a model of the user and a model of the database in mind, rather than created haphazard.
9. Routing decisions will be based not only on journalistic/data considerations but also on the commercial aspirations of the IP.
10. Consistency in choosing key numbers for specific functions will help the user find his way about the database and help the database manager keep track of his database. In the long term, some standardisation across the whole Prestel database may have to be considered.

## THE PAPERLESS CARRIAGE

LONDON 21st June 1978

27th Sept 1978

## Seminar Notes

The aim of the seminar was to set the scene for the Editorial Development Contract, at the end of the first three months' introductory period, by examining the context within which viewdata (Prestel) can be studied and understood.

Anthony Smith - media and information specialist - looked at viewdata in its historical and technological context. Prior to the invention of moveable type in the 15th Century, the distribution of text was highly constrained by the slow speed at which original manuscripts could be copied. Indeed the reader travelled great distances to the repository of the original document. With books (and of course viewdata) the text travels to the reader.

Also, prior to the invention of moveable type, the idea of the 'eponymous' author was largely unknown. With the coming of printed books, the idea of authorship arrived. Viewdata shows signs of reducing the individuality of authorship again (most viewdata pages on the system are the product of a collective organisation, with no single authors named - indeed the editing technology may reduce authorship notions).

Moveable type reduced the inherent elitism of manuscript culture, by bringing in the possibility of mass distribution of information. Books however, lost the personalised, individualised mood of manuscript culture. Viewdata looks like reintroducing individualisation - the viewdata reader buys an item of information not the whole package (the page and not necessarily the book). All still within a mass medium context.

The characteristics of viewdata are visible in other information technologies today. The modern computer-produced and computer-administered newspaper (mailing lists for example) is increasingly 'tailored' with special supplements for special geographical areas of the city. The problem is that the van delivering the evening edition is stuck in the same traffic jam as the commuters returning home. Hence the attraction of electronic delivery systems.

The significance of viewdata in relation to broadcasting is that there are no transmission constraints. All pages can 'go out' at peak hours simultaneously (the notion of 'going out' is inaccurate since the viewdata pages are 'out' all the time, day and night). Viewdata offers the potential of realising the much prophesied 'all-day newspaper'.

Finally, viewdata heralds a new openness of access, not quite so constrained by traditional literary habits, by transmission tyranny or production cost.

Richard Hooper - of Mills & Allen - took the seminar in closer to viewdata specifically with the question - "What kind of a medium is it?" He suggested that one looks at viewdata (specifically in its Prestel implementation) under five main propositions:

- VIEWDATA IS
- the world's first individualised mass medium
  - a publishing system, rather than an information retrieval system
  - an update medium (every second is a deadline)
  - a promotional medium (each page promotes subsequent pages)
  - not a very interactive medium ..... yet

(See Section 3 of this report for more detail).

Dr Ederyn Williams - Head of Prestel Information Management and Behavioural Studies - presented on Prestel itself his guide to editors. He put forward various guidelines for graphic design, use of colour, routing structures, based on what little we know about users' habits to date, evidence which at the moment is scanty.

Dr Alex Reid - Director for Prestel - spoke about the role of the Post Office. He concentrated on the major policy decision to go common carrier (the PO would own and run the distribution system but not the information being distributed e.g. as with telephones). The common carrier policy was formulated because:

- it would be politically difficult for the PO to adopt an editorial stance towards information. That is not and has never been its business.
- it would be administratively impossible to pre-censor all pages before publication (and would massively increase PO costs and therefore costs to IPs and to end users).
- the common carrier policy would unleash the sort of competitiveness which would directly influence Prestel's market success. Many IPs would not have come on board under different arrangements.

## WRITING FOR PRESTEL

LONDON 15 Nov 1978

## Seminar Notes

Rex Winsbury : Putting up the Style

After Richard Hooper - Managing Director of Mills & Allen Communications - had welcomed the 70 or so participants, the seminar was opened by Rex Winsbury, Editorial Director at Fintel. Winsbury's notes are on Prestel pages 2480311 - 2480319.

Winsbury distinguished between what he called traditional and Prestel-specific elements of style. Traditional elements - elements he as a journalist is familiar with from newspaper work - are page layout and editing the copy. Prestel-specific he defined as use of colour, index/information structure, and pricing.

He made a similar distinction in page styles. Traditional styles are text, directory and statistics; Prestel-specific are the use of graphics and indexes.

Winsbury showed Fintel's house style on pages 2480330/00/001, a page by Financial Times correspondent Michael Cassell on the construction industry. Text was in green with key words in cyan. Sentence structure was literary yet concise, clearly derived from the FT's own house style.

Concessions to Prestel were - the breaking of paragraphs to provide at least one blank line; not breaking sentences across a page-change (as the New York Times have done, page 25014214); free use of abbreviations and hyphens to help put more information on each page; key-word highlighting. This last had a second purpose: if and when "key word searching" is available, Fintel would consider using the cyan character as the control.

Fintel's style contrasted with the all-graphic text page by the Health & Safety Executive (57556) and a page (69651, produced specifically for the Editorial Development Contract) which split the screen into four quarters.

Winsbury also accessed two pages of statistics, one from Fintel (531600014) and one from datastream (53531660) to show contrasting styles.

Fintel seldom use graphics, apart from advertisements and the occasional bar graph. "The audience won't love you if you charge 5p for a picture". But he presented several graphics by other IPs, including designs of people (Sports Council 300014, Cancer Research 24072, HEC 5757, Norwich Union 2331c).

Fintel indexes are "straight" (eg 2480630) but there are certainly other ways of presenting them, notably in alpha-graphic (Sports Council 30001), in double column alongside a quote (Editorial Contract 6965120) or graphically (696510 and by contrast 20214).

On sources, Winsbury illustrated four kinds: original material (248033001), that commissioned from specialists (24803302), abstracts (531021100) and articles already in print which have been edited and indexed (24803301).

Winsbury split text style into five kinds; chat show (696531) where the viewer responds to questions and chooses pages according to the answer he gives; For your information (directory); Do You Read Me (20910: a weather report; he quoted communications consultant Tony Smith on this particular page "It's pretty, I've read the words, but does it communicate with me?");

A Message from our Sponsor: ie a sponsored page (24892, sponsored by Cadbury); and Man v Machine: the computer-to-computer update which is only intelligible by other computers (48873/731/7311).

Finally, Winsbury briefly described, under the heading Architectures of the Mind, a vision of routing structures, the crucial difference between writing for Prestel and writing for any other medium. The structures (and titles) he offered were Tree, Cartwheel, Wheel of Wheels, Lobster Pot and Chinese Lantern.

### Douglas Evans: Energy Policy (experimental pages) 69651

Three sets of pages on aspects of current affairs have been produced at Mills & Allen during the Editorial Contract, by writers new to Prestel. The aim was to let the three investigate new ways of presenting new information, independently of the existing styles on Prestel, and therefore independently also of the Mills & Allen house style.

Douglas Evans, leading writer on energy and former London Times and Toronto Globe and Mail journalist, presented his pages on Energy Policy.

He highlighted the difficulty he found adapting from his normal writing process for books to writing for Prestel. He had begun with an index and introduction; but then realised he needed a front page (69651) which would capture the reader with selected snippets of information to show the extent of the energy industry, followed by, on the b and c frames, a set of questions opposite to the current debate. His original introduction he re-named Back-date as it was a brief digest of the background to current problems in energy policy.

His structure, coincidentally, bore an uncanny resemblance to Winsbury's wheel of wheels: a central index (designed as a wheel) with eight sub-sections, many of them with their own indexes.

The sub-sections were Conservation, Coal, Oil, Gas, Electricity, Nuclear Power, Alternative Sources and Environment. In each he produced a summary of current policy with an underlying critique.

He then illustrated his readership market with four characters: an oil company executive representing the energy industry; a gas pipeline executive, representing the support industries; a maker of solar panels, representing the alternative approach and a treasury official. He accessed the pages each would find useful.

Evans agreed with a suggestion from the floor that his pages would only provide the starting point for the readers he envisages; for detailed information they would have to look further.

Other contributors from the floor suggested Evans had underestimated the potential market; the information would especially interest sixth formers, for example.

Finally, Evans demonstrated the use of the sub-indexes in various sections, which enable the reader either to read serially about, for example, nuclear power or to access directly a page on an individual topic like reprocessing.

Dr. Alex Reid, speaking from the floor, commented on the potential for keeping such a set of pages right up to date; but he raised the question of "the reader's detective game" on where and when a set of pages has been changed; to make updating worthwhile the reader must be told of the fact, but how and where?

One other problem raised from the floor concerned the colour scheme. Evans explained that being colour-blind, he had left the choice to Paul McFarland at Mills & Allen. Foot-of-page prompts were green to balance the green of the IP title at the top, each page had a heading in red caps, with text in cyan for first and last paragraphs, yellow for the middle ones. But various members were drawn by the colour to infer either emphasis or a relation between paragraphs of the same colour which was unintended.

### Mike Bygrave: Law and Order (Experimental pages) 69653

Mike Bygrave, founder member of Time Out and now a freelance journalist working for The Observer and Penthouse amongst others, presented the second set of experimental pages.

Bygrave called his pages an Open Debate. The main stream was a presentation of the current debate on Law and Order, with the views of both sides and where they agreed or disagreed.

In addition, five sub-sections (on Police, Prejudices, Crime Figures, Prisons and Young People in Trouble) could be accessed either at appropriate stages in the debate or via the index. The debate ended with suggestions for further reading and a quiz.

Bygrave's approach to the medium was essentially that it is active: no page appears until the reader chooses. Several pages were thus only accessible according to a choice based on the reader's reaction to the page before.

Thus at the start of the debate: the reader, given the mainstream left and right wing standpoints on Law and Order, is asked to agree with one or the other, by pressing either of two keys. He then gets a page giving the arguments against the view he has chosen to take. At one stage the reader is given alternative answers to the question Why Crime? and asked to agree with either or neither; any of the three keys he can press take him to the same page, which tells him "None of the explanations is in fact correct".

Bygrave also pre-empts the eventual facility for response pages. After being given the case for and against new Conservative proposals on the treatment of young offenders, the reader is asked to vote on the Tory plan. "As to what we actually do with all these votes and how we handle the problems of making sure no one votes twice .....I have no idea". (Page 6965945)

Bygrave's style - earlier referred to by Winsbury as "chat-show" - was direct and informal, very compact, yet still employing fully grammatical sentences with few exceptions.

Page design showed several variations on the same theme: text mainly cyan, rules and some alpha-graphic in red, motifs (two were used, most pages having one or other) in white and occasional yellow for highlight. Prompts were in cyan with "press n" in green.

Most pages carried a left-right diagonal theme with the heading top left and a motif bottom right being both very strong. "A basic design problem I found was how to separate the top line (IP name and page number) from the body of the page. Page heads in red caps and rules or red alpha-graphics helped split the text from the top line".

As to a likely market for these pages, Bygrave envisaged a much more popular audience than did the two previous speakers.

Finally, Bygrave suggested that writing and designing were inseparable processes and called for a book of current basic styles on Prestel, which might make the writer's job a little easier.

David Gordon : Thoughts of a novice viewdata writer

David Gordon, viewdata editorial director at The Economist, began his after lunch speech - "Watch me, rather than the screen, because I am much more interesting. Despite appearances, I am a human being."

He continued on a sober note, "Viewdata has no charm, no personality, no pictures, it's boring, a 'turn-off'. Once the novelty has worn off, expect hostility. We need to inject as much liveliness as possible, and regard viewdata as a new medium, not just an offshoot of newspaper or TV or magazines."

Gordon compared The Economist with viewdata. One issue of The Economist has 60,000 words, costing 50p. That might be 1,000 pages on viewdata at 1p = £10. Viewdata has no decent charts or pics, no overseas circulation and seems more suited to fact than opinion. The Economist is big on informed opinion plus the facts. It is also portable. So why did The Economist decide to get into viewdata? This is a way of dipping the toe in the electronic publishing water. The Economist group has lots of information that can be served up in different ways, e.g. the Economist Intelligence Unit. "We regard viewdata as R & D at this stage".

The organisational aspects of the Economist's viewdata operation: editorial director and a viewdatabase manager (2 different skills); arts and science complementing each other. Viewdata is separate from the Economist with its own budget etc., but the viewdata office is right among the journalists. The placing of the terminal is important. It is accessible and other journalists can use it, and comment on it.

The Economist is likely to put up data on countries. But with punchy text intro's - not just statistics, "We will actually pay journalists to write for Prestel" - so they will be interested.

Finally, Gordon reminded the audience that this is a new medium, yet the words are OLD: information provider, page, magazine. Perhaps we need a new language - databuilder, viewdatabase.....

"The quality of the product, and its price, needs to be fit for a large and demanding market, before the market is there".

Paul McFarland : Lucas Aerospace ; Study of Alternatives (experimental pages) 69652

These pages were written by TV researcher Tim Hodlin. He was, however, unable to attend the seminar, and the job of presentation fell to Mills & Allen's Paul McFarland.

Hodlin envisaged the pages as back-up information, perhaps in response to a recent news item. McFarland explained that during the creation of the Lucas pages, the subject was covered by a two-part TV documentary.

The benefits of treating the same material on Prestel were two: the information was accessible at any time, though the spread of the VCR will largely reduce the advantage; and the material can be studied at leisure as background information for those whose interest has been stimulated.

The material was divided into front page (a brief explanation of the problems at issue) an index and six filial sections (two more are proposed). Under each filial, the material is arranged serially on frames, with cross routes to all other sections.

The first page of the first section (696521) stimulated a debate on language. Hodlin's style resembles programme notes for TV: Short sentences, frequent abbreviations, scant use of main verbs. McFarland referred to the style as Viewspeak.

One speaker from the floor commented on the effect of such a style on the already poor grammar of many potential readers; another on the welcome attempt to experiment with new ways of stringing words together in a new medium. Both received support for their points of view.

The material presented the history of the Lucas Aerospace Shop Stewards Combine Committee and its attempt to fight redundancies by proposing diversification; the company could continue to utilise the skills of its work force by making new products. Moreover, these products could be socially useful, compared to the making of arms.

The company position, however, was missing. Hodlin's own letter to Lucas chairman Bernard Scott was followed by a frame saying Scott had not replied. The use of a flashing underline beneath the word "not" prompted another hot debate on the floor. "Polemic" was sadly a rare thing on Prestel; it was fortunate that such biased presentations were rare; Prestel was just the right medium for presenting the stance of individuals/organisations; what about the journalist's commitment to objectivity (not unique to Prestel); all information was slanted, but information under the name of an IP company or an organisation always looked less so than that by-lined by a writer; the use of the flash was a leading device.

Richard Hooper commented from the chair that these pages had always stimulated vigorous debate; that they were often best received by groups of readers instead of by individuals, though Prestel was usually envisaged as a one-to-one medium.

Hooper added that so far no presentation of Hodlin's controversial piece had run through all the pages. And so it proved.

### Sir John Barran : The Government Experience

Third and last of the IPs to take the floor, or rather take the keypad, was the COI's Sir John Barran, who demonstrated the government's approach to a daunting task.

It was daunting for two reasons: The bulk of information meant that structure and routing was crucial; and as much of the information was derived from legal or legal-style originals, it had to be transformed both to suit Prestel and to make it comprehensible to the lay reader.

The COI's first function was to direct the reader to the department/organisation/subject he wants, much of which involves indicating other databases. Under 5001 information is accessed in three ways: a list of main government departments; an alphabetical list of all government departments and organisations on Prestel; and a subject index.

Style is a similar problem because of the bulk of information. The COI was developing its own house style: Sir John illustrated this with page 5007, where cyan is the text colour with green highlights (i.e. the reverse of Fintel's text style). Graphics were seldom used, though on for example, page 422119, the Office of Fair Trading on cars, a graphic car was introduced for the benefit of users at the Motor Show.

Sir John's main emphasis, though, was on routing, and the COI's intention was to give the reader every possible route to a piece of information.

He then illustrated the government approach by taking the audience through two sets of pages.

The first was the Office of Fair Trading (422) and the problem of faulty goods. He accessed the information available on electrical goods, through sections on Your Rights and How to Complain (42212). Notable was the occasional indication of how many frames there were on a section, giving the reader an indication of what he has let himself in for.

The second was Choosing a Career (2701). Using three possible routes - an alphabetical list, an index of interests, and a school subject index - he showed how to arrive at the same set of frames, in this case information on nursery nursing: job description, list of qualifications and information on job availability (27010552a/b/c).

### Professor Raymond Williams: Concluding Remarks

Professor Raymond Williams (close relation) gave in conclusion the views of an outsider, albeit an outsider who is expert in the theory of communications.

Viewdata seemed to be a medium which reduced the element of pre-selection. The viewdata viewer could opt for an item that he/she wished to see, without having to buy the whole package.

"It is quite extraordinarily dangerous to live in a relatively uniformed society", he said, adding that he had learnt a lot just from reading the various pages as they flashed past. Elections and opinion polls, for example, required people to express a view without any requirement to know the facts.

Prestel, however, offered a chance for an informed expression of opinion. Professor Williams referred to the vote page in the Law and Order piece seen earlier (696534f).

The passing of information was such a difficult task, one that had long exercised man's genius.

On the strict subject of writing for Prestel, Professor Williams was glad to see some experimenting with the sentence structure. "The English sentence is a very flexible animal, and we all know what happened to it with the invention of printing. We shouldn't feel confined by it in Prestel".

He added that the qualifying clause should be dropped at all costs. There was a clear need for a crisp style compatible with the size of the individual page.

In conclusion he said "I wish that when other new media had been introduced there had been this kind of professional discussion ..... We'd have had better newspapers and better radio. So let's have better viewdata."

## DESIGNING FOR PRESTEL

London 14th February 1979

## Seminar Notes

Mervyn Kurlansky : Graphic Design for Prestel

Seminar Chairman - Richard Hooper - welcomed the 75 participants and introduced the first speaker : "Once upon a time a very famous graphics designer called Mervyn Kurlansky of Pentagram Design was lying on a beach in California". We had to wait for the explanation.

Kurlansky devoted the first part of his talk to his designs for the Prestel logo and the Post Office index pages. The task was a unique opportunity to design the identity of an entirely new organisation: so often one had to work within the remit of an existing identity.

But on the minus side, he had to work with the same tools as every other designer on Prestel : seven colours, one typeface, one alphagraphic and one graphic mode.

Using slides (that's not cricket, is it) he showed how, even in print, with the advanced range of colours, typefaces etc., available to designers individuality is rare - three of the biggest oil companies use the same basic red, white & blue colour scheme - and for every instantly memorable logo there are dozens of entirely forgettable ones.

It was on that California beach that Kurlansky hit on the "Prestel has seven letters/Prestel displays seven colours" idea - it offered both a unique design for the Prestel trademark and at the same time identified the word Prestel with the concept of Prestel.

From there came the shape. Spacing between the letters was inevitable in the absence of a contiguous colour-change facility. The diamond shape was adopted for letter-heads, posters and all the promotional trappings right down to the tee-shirts.

The next step was the PO indexes. Caps seemed easier to read on Prestel. The absence of proportional spacing meant letters like 'i' and 'l' and words like 'will' were almost as widely spaced as were separate words (Kurlansky works on a sans serif ITT set, he confided later. Sets with a serif typeface don't have such problems), but within the indexes lower case was used for non-essential information to provide contrasting emphasis.

He had experimented with local identities - particular colour schemes for London, Birmingham and Norwich - and with using the PO alphagraphic mode, but in the end settled for a uniform and quieter approach.

Kurlansky then moved to the problems of the individual IP. First, there was the adaptation of an existing identity. Even given that some logos were more suited than others to Prestel graphics, there was still a sameness about the end results.

What was needed, he said, was a range of alphagraphic modes and a finer graphic matrix - both of which were feasible. In addition, flexibility was essential. His slides illustrated the great developments in print technology over the last 500 years which now offers such a range of design opportunities. By comparison, Prestel's limitations indicated a giant step backwards. Nevertheless, he thought every IP would benefit from consulting professional designers in an effort to get the maximum out of minimal facilities.

## Experimental Pages (\*6966)

At the last seminar we asked three writers to write for Prestel. This time we chose to avoid literary text, partly because of the weight of "directory type" information on Prestel, partly to try and concentrate on designing pages without the added complications of editorial decisions and constraints.

We chose a railway timetable because we are all users of such information at some time or another; and we chose London-Cambridge for its special Prestel relevance - Ed Williams and Dr Alex Reid spend much of their time on that line.

We gave five people BR's pocket timetable and asked them to work independently of each other and of us, so that their only points of reference were the British Rail (\*221) and ABC Travel Guide (\*223) versions.

The designers were:

Mike Bygrave - who wrote the Law and Order pages (\*69653) for the last seminar

Linda Reynolds - whose Graphic Information Research Unit at the Royal College of Art has studied the legibility of Prestel

Ian McLaren - graphic designer and designer of PA Design Unit pages (\*235)

Hilary Whelan - database manager and designer of the Economist's pages (\*393)

Dr Peter Zorkoczy - who runs the Open University's Prestel operation (\*258)

Each presented his/her pages and outlined the reasoning behind both their designs and their inclusion or exclusion of details. At the end Paul McFarland of M&AC revealed he had subjected each set of pages to a "model of the user", and compared their efforts accordingly.

Mike Bygrave (\*69662)

Bygrave suggested the real problem was not how to put a pocket timetable on the screen, but how to put up the full BR timetable. It would be an impossible exercise because of the scale involved; and in fact BR had no intention of doing so. Their plan was to take the top 400 trips between any two stations and use Prestel for those timetables in the hope of reducing the load on their telephone switchboards.

Similarly, the London-Cambridge pocket timetable was no such thing; it was in fact the London-Kings Lynn timetable; or rather an extract from seven close packed pages of the full timetable.

Bygrave included one piece of information not on the pocket version - fares; but he confessed he cheated, because he failed to comply with the law and give all the terms and conditions.

His main design concern was simplicity "or rather, non-design" with the aim of giving the user as much information in as few pages as possible, and including cross-routes for return journeys, to cut down on pages accessed. He packed the depart/arrive times into two, sometimes three columns to get a single day on a frame and so let the user drink in as much detail as possible without pressing more buttons.

Colours? Blue horizontal rules top and bottom with page title in cyan; text in white, prompts in yellow and route numbers in green.

#### Linda Reynolds (\*69661)

Miss Reynolds concentrated her talk on the colour problem. She had designed pages easy and pleasant to read, with less concern for the number of pages used than for instant legibility. The result was single column of depart/arrive times, with the continuation where necessary, on the b frame.

Miss Reynolds discussed the problems caused both by the acuity of each colour and the sensitivity of the individual user's eyes, and the further problem of chromatic aberration, whereby certain combinations can appear in different planes, making them very difficult to read.

As a result she had chosen very functional colours, white for headlines as it was strong, green for the text as green was believed easiest on the eyes, and cyan for buffet and restaurant information, avoiding the much less luminous blue, red and magenta. She also received much support from the floor for her decision to write out in full the ancillary information.

#### Ian McLaren (\*2358)

McLaren presented much the most comprehensive of the timetables; his aim was to reproduce the full London-Kings Lynn times as printed in the pocket timetable, giving all the intermediate stops where applicable.

As a result, more end pages were needed, and to access these easily and quickly McLaren broke up the individual days into four or five choices of time of day for travelling - i.e. asking the user to make a further decision on his way to the information.

Each train was printed with the stations on the vertical axis and the times on the horizontal with vertical colour banding (alternate white and cyan) to enable the user to follow a train down the screen more easily. Refreshment information was in blue at the head of the column (where necessary) and prompts in red.

#### Hilary Whelan (\*3933)

Miss Whelan produced a full index for "Traintel" to lead into the London-Cambridge timetable. She was also the only one of the five to design a graphic identity for her pages - a 'lego-railway line' - which dovetailed into a banner for the top of each information page. The intention was to give the user "some degree of interest other than pure information".

The graphic was in blue: "I used a dark colour because the more luminous ones were too bright", with the page headlines, abbreviations and prompt numbers in white. Text was green and prompt descriptions in cyan. The information was tightly packed and multi-column, as was Bygrave's, and for the same reason.

Miss Whelan also used her London-Cambridge master page to introduce a "latest news" feature - details of anticipated delays, cancellations etc. The update load would be great (a daily change page for each journey on the system), but it was felt to be worth it.

#### Peter Zorkoczy (\*2589)

Dr Zorkoczy worked within what he saw as three constraints - those imposed by the IP, by the user and by the system. The result was a set of pages designed for their economy of scale and of cost.

Two features, unique to the five experimental sets, were presented. On the London-Cambridge master page, he gave a paragraph of basic information: approximate journey time, and departure times of the main weekday daytime trains; in theory many users would need to go no further.

The second feature was 'hidden' cross routeing on the six end pages of timetable details. To give all five cross prompts plus ways back up the tree would necessitate devoting extra space to routeing information at the expense of page content. So prompts were given for cross reference most users would take; and in time, perhaps, the user would learn that all the routes were available and that he could therefore access them without referring back to the index.

Dr Zorkoczy also introduced horizontal colour banding in cyan and white for the timetable information. Blue rules and yellow highlights completed the colour design.

#### Statistics

Paul McFarland described a particular model of the user: one who wanted to travel to Cambridge on a Friday night, eat on the train, return Sunday and to know before he leaves home (a) that the trains are running despite the weather and (b) how much the fare is.

How many pages would he need to access, including the London-Cambridge master page? Bygrave 4, Reynolds 5 (including an (a) frame accessed to get at the (b) frame), McLaren 8 (the more comprehensive structure meant returning to the master page for information on the second journey and working through more detailed indexes than in the case of the other four designers), Whelan 4, Zorkoczy 4, (though the user familiar with the hidden routeing would do it in 3 accesses).

All five gave the refreshments information - though one didn't distinguish between 'restaurant' and 'buffet'. But only Whelan told the user the trains were running that day; and only Bygrave quoted fares.

This particular model journey was concocted before the five sets of pages had been seen; it was curious that none of the five designers produced all the required information, and neither did ABC or BR.

### Ken Knight :Routeing - The Design Opportunity (\*69666)

After lunch, Ken Knight put the case for the need for routeing methodology in every database: "to my mind one of the key factors in good Prestel design".

Knight -database manager at Mills & Allen Communications - set the scene with a description of the way pages can be linked together or not; because "Prestel itself makes no restriction, no design assumption". A routeing system is necessary therefore, and designing that system presents the IP with a major opportunity.

What might these objectives be? Knight instanced five possibilities. Clearly they must be linked to Prestel's special problems. Firstly, the frame size is so small compared to other media that "the 'joins' become a rather large aspect of the overall effect".

Thus, as the routeing is potentially distracting, even boring, it must be quick, as in the example from the Britannia Group of Investment Companies (\*48091), where the user is quickly led to information, each page providing both routes and information.

(Knight stressed at this point that he had used different examples to illustrate each objective merely for the sake of variety. He could have illustrated them all in a single database; similarly, a good system need not necessarily fulfil all objectives).

Another Prestel problem is the isolation of the individual page. In a book for example, the reader has a concept of where he is in relation to the rest of the information. Not so in Prestel. So routeing must be helpful. "The routes need to anticipate the reader's needs and provide for them". Thus pages from IBM (\*2401): the reader wanting to buy a typewriter can choose one, change his mind and choose again, and then if he wants, order the machine or supplies for it. At each step, the routeing offers choices to suit the user's several needs or whims.

Less serendipitous than the "anticipation of needs" is "usable" routeing - such as Post Office Telecommunications pages on data communications (\*3838) - which gives the reader ways down the tree, ways up, ways across, doesn't force him to repeatedly return to an index when he is trying to read through a section, and is consistent in the use of key numbers.

Routeing on Prestel is at its best according to Knight when it is comprehensive. Tramway Museum Services pages (\*2409) for example, offer three different ways to access information on museums - geographically, alphabetically and by type.

The most important objective however, is intelligibility. "However well our routeing meets the previous objectives it will be no use if the reader cannot understand it". Consistency, is one aid to intelligibility. The other is the form of the words used in the routeing information. "Index press 0 - what index; next press square - next what?"

Knight illustrated this point by following a set of prompts through the Prestel index ("a model of clarity") which lead to RAC information on Buying a Second Hand Car. (\*0 to \*240216)

Clearly then objectives will vary. What objectives an IP had were less important than that he/she at least had some objectives; that a style was adopted to meet some chosen objectives.

Whatever the objectives, two factors would enter into the design of routeing style, the model of the reader and the model of the database.

The reader may enter an IP's database at the three or four digit level, or further down for example, via the Prestel index - so routeing assumptions explained on the master page might be bypassed.

Once into a database, however, the reader begins to seek out the "hidden gems" of information in it. Pages from Sealink (\*5454) illustrate a straightforward "seeking" procedure. The assumption is that the reader knows what he wants and can find it without substantial error. Thus there is no explicit way back up the tree.

The most common alternative to this "hide and seek" is what might be called "seek and seek". WH Smith's pages (\*4004) on music/records enable the reader to retrace his steps and start again. A degree of uncertainty and the possibility of error is admissible in the model of the reader.

The second consideration is to ask where the reader might finish. Many Prestel editors seem to assume the reader will finish on one of the end pages of information. Equally likely perhaps is a sideways move into another IP's database. Presentation pages produced for Prestel's international market (\*646) illustrate the notion of a universal get-out page from any of the pages, press 9 to leave the presentation.

What the reader does in between arriving and leaving an IP's database "offers most scope for routeing design, for argument and for making money!" So the model of the reader must include some notion of reading many pages at the end information level.

One assumption is that made by the Stock Exchange (\*520044). This is the next page notion, which is both simple for the IP to implement and pleasing to the reader educated in print media.

More ambitious is the cross reading/cross reference model. Here Knight discussed the experimental timetable designed by Peter Zorkoczy (\*2589). The model of the reader wanting to go to Cambridge is that he will also want to come back, but in addition to that cross reference all the others are implicit in the key allocation, which relates directly to the last digit of the co-filials of any end page.

That these models of the reader be simple is vital - vital to the reader if he is ever to understand how the IP envisages his behaviour; and vital to the IP who needs a simple and comprehensive database.

The database manager will require another model - that of the data. So design structures must stand the test of time, allow for additions, amendments, deletions etc., and the database manager must have a concept of the whole as well as the part.

Most data will fall into a natural structure by itself, be it by categories (as Family Living's index \*550) or by geographical area (Comet \*3501000), or by time (Vernons Sportsdata, \*34591), or by a number of such factors in hierarchical order.

The database manager then needs to have his information broadly categorised according to some model of the reader, that means keeping pages of similar information in the same part of the database and keeping individual pages on the same number - readers do remember them. On the other hand page mobility is vital for e.g. a push-down stack of news items.

In the grasp of the information in detail, routing design is a key factor. For the implications on other pages of an amendment to one page to be grasped (as well as for easy copying and deletion) editorial staff need a thorough knowledge of the database. Mere documentation leaves much to the accuracy of records, and with no explicit order, abstracting the information from the records is no easy task.

This ordering is the nub of the matter according to Knight. The algorithmic method - the adoption of routing recipes that embody models of the reader and the data structure - is a great advantage. One such recipe is the tree structure; and by being built into the Prestel editing system it is easy to comprehend. It makes the entry and exit routes to and from each frame instantly deducible, and so changes are easy to implement.

Unfortunately, it offers no routes back or across, and as such is a poor reflection of the model of the reader. Better and more sophisticated recipes must be found: "that is the design opportunity".

#### Sam Fedida: The Design of the Viewdata System

Sam Fedida, the inventor of Prestel, returned to the theme of the image of Prestel - first discussed by Kurlansky - but chose to look at the system as a whole rather than at any individual database on it.

Whether we like it or not he said, Prestel will have an image. It may be seen, in his own words as a first port of call in the search for information. It may be seen as an educational medium; or as a communicative one.

The image he put forward was that of the shopping precinct. A very different one to, say, the model of the magazine with an editor. But in his survey of the shopping precinct, he had found 20% of the "shops" boarded up, 13% empty, and 10% with signs up saying "come back next week".

That was one kind of image - that produced by Prestel in the mind of a user perhaps.

Then there are those images created by technical factors. If it is a replicated information system, then the operator (i.e. the Post Office) controls it because the operator controls the storage space. If on the other hand Prestel is seen as a computer to computer switching centre then the operator has no control.

At present, however, Prestel is a replicated system. The image of the space on the system is moreover controlled not only by the operator but by other technical factors. In theory storage capacity is infinite. In practice it is not.

One limitation is the number of people on the system at one time. Thus the shopping precinct can either let in so many at one time or open its doors to all - in which case they would go through the floor.

Similarly, if there are too many IPs on Prestel the accesses will be spread so thinly that no single IP will recoup his expenses. But if Prestel were a switching centre there would be no limit to the number of "shoppers" at one time, and therefore no limit on the number of providers of information (shopkeepers).

Other images see Prestel as essentially a fun medium. Hence the message facility which was experimented with on the Marlesham Heath computer during the pilot trial.

Again, Prestel can technically be adapted as a computer assisted learning tool, and Fedida showed on the Martlesham computer how this would work.

Clearly the system has potential as a carrier of electronic mail or as an electronic newspaper. Similarly, there are desirable improvements - 80 characters a line, a finer graphic matrix, the ability to display photographs etc. But these would need technological improvements and particularly a much faster transmission speed from the present 1.2 k bit/sec to perhaps 7.6 k bit/sec.

But rather than bring in such improvements piecemeal, it makes economic sense for both the Post Office and the TV manufacturers to introduce them in five-year phases.

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